

Horticulture Series No. 589

March 1988

T600
G 790
P180
2999

cardc

O. A. R. D. C.

AUG 23 1988

LIBRARY

GREENHOUSE TOMATO BREEDING FALL CROP 1987 EVALUATION TRIALS, WOOSTER

W. A. Erb, N. J. Flickinger, and J. J. Sonowskii

The Ohio State University
Ohio Agricultural Research and Development Center
Wooster

639
043

This page intentionally blank.

Greenhouse Tomato Breeding Fall Crop
1987 Evaluation Trials, Wooster

W. A. Erb, N. J. Flickinger, and J. J. Sonowski¹
Department of Horticulture
The Ohio State University
Ohio Agricultural Research and Development Center
Wooster

This report presents the results of the greenhouse tomato cultivar trials performed in the fall of 1987 at Wooster. Seed for this trial was donated by The OARDC/OSU and 5 seed companies (Table 1). Both red- and pink-fruited cultivars and selections were evaluated. The response of the cultivars in the trial to some of the major tomato diseases is presented in Table 2.

Materials and Methods

Nine pink-fruited cultivars and 6 pink-fruited experimental lines and 17 red-fruited cultivars (Table 2) were evaluated in a replicated trial as a fall crop in 1987. The trial had 18 plants/entry divided into 3 replications. The trial was conducted in a greenhouse covered with polyethylene film. Seeds were sown on 6/16 and seedlings were transplanted into 4 inch plastic pots on 7/2. Plants were placed into steam sterilized ground beds on 8/6.

There were 6 plants per row and the spacing was 36" between and 18"

¹ Assistant Professor, Agricultural Aide, and Research Associate

Publications of The Ohio Agricultural Research and Development Center are available to all on a nondiscriminatory basis without regard to race, color, national origin, sex, handicap, or religious affiliation.

Table 1. Name and address of the seed companies that donated seed for this study.

Table
Code

| | |
|-------|---|
| 1. BR | Bruinsma Seeds b.V., PO Box 24, 2670 AA Naaldwijk, Holland |
| 2. DR | DeRuiter Seeds, Inc., PO Box 20228, Columbus, OH 43220 |
| 3. RS | Royal Sluis, PO Box 22, 1600 AA Enkhuizen, Holland |
| 4. SK | Sakata Seeds, C.P.O. Box Yokohama No. 11, Yokohama, Japan 220-91 |
| 5. ST | Stokes Seeds, Inc., Buffalo, NY 14240 |
| 6. OH | Ohio Agricultural Research & Development Center/Ohio State University |

Table 2. Fruit color and the response of the cultivars in this trial to some of the major tomato diseases.^{2Y}

| Major Greenhouse Tomato Diseases | | | | | | | | | |
|----------------------------------|----------------|----------------------------|---------------------------|-------------------|-----------------|-------------------------|---|----------------|--------------|
| Entry/ Seed Source | Fruit Color | TMV (Tm2 ²) | Fusarium | | | Vert. Race 1 (Ve) | Root Knot Nematode (M. incognita) (Mi) | Cladosporium | |
| | | | Crown & Root (FCRR) | Race 1 Rot (I) | Race 2 (I-2) | | | Race 2 (C2) | Race (C5) |
| Ohio CR6/OH | Pink | R | R | R | S | R | S | S | S |
| Ohio 1403/OH | Pink | R | R | R | R | R | R | S | S |
| Ohio 1412/OH | Pink | R | R | R | R | R | R | S | S |
| Ohio 1413/OH | Pink | R | R | R | R | R | R | S | S |
| Ohio 1497/OH | Pink | R | R | R | R | R | R | S | S |
| Ohio 1498/OH | Pink | R | R | R | R | R | R | S | S |
| Ohio 1499/OH | Pink | R | R | R | R | R | R | S | S |
| Caruso/DR | Red | R | S | S | R | R | S | S | R |
| Laura/DR | Red | R | S | S | R | R | S | R | S |
| Perfecto/DR | Red | R | S | S | R | S | S | S | R |
| KR-2/DR | Pink | R | R | S | R | R | S | S | R |
| B82-864/DR | Pink | R | R | S | R | R | S | S | R |
| KR-12/DR | Pink | R | R | S | S | R | S | S | R |
| No.29FT-R/SK | Pink | R | S | R | S | S | S | S | S |
| Pink No.12/SK | Pink | S | S | R | S | S | S | S | S |
| Fireglow/SK | Pink | R | S | R | S | S | R | S | S |
| Firedance/SK | Pink | R | S | R | S | S | R | S | S |
| Dombello/BR | Red | R | S | S | R | R | R | S | R |
| 2029/83/BR | Red | R | S | S | R | R | S | S | R |
| 994/85/BR | Red | R | R | S | R | R | S | S | R |
| Dombito/BR | Red | R | S | S | R | S | S | R | S |
| Dukado/BR | Red | S | S | S | R | R | S | R | S |
| 2084/81/BR | Red | R | S | S | R | R | S | R | S |
| 617/83/BR | Red | R | S | S | R | R | S | R | S |
| 2173/84/Br | Red | R | S | S | R | R | S | R | S |
| Jumbo/BR | Red | S | S | S | R | R | S | R | S |
| 986/84/BR | Red | R | R | S | R | R | S | R | S |
| Bonset/RS | Red | S | S | S | S | R | S | R | S |
| Proset/RS | Red | R | S | S | R | S | S | S | R |
| Zircon/RS | Red | R | S | R | S | R | R | S | S |
| Tropic/ST | Red | S | S | R | S | R | S | S | S |
| Ont. Pink/St | Pink | R | S | S | S | S | S | R | S |

² Resistant = R and Susceptible = S

^Y Fireglow and Firedance are resistant to septoria leaf spot.

within rows. A peanut hull mulch was applied after transplanting. One month after transplanting a perforated white plastic bench film (donated by Ethyl Corporation, Visqueen Film Products Division) was laid between the rows. The first week of the study and once a month for the entire study plants were fertilized with 869 ppm KH_2PO_4 and 1321 ppm K_2SO_4 . Starting the third week of the study and once a month after that plants were fertilized with 1850 ppm K_2SO_4 and 2040 ppm MgSO_4 . On 9/28, one 2300 ppm application of KNO_3 was applied.

Cultural practices during the growing season were standard. Plants were hand pollinated with an electric vibrator and watering was done with a hose. Temperatures were 70 - 75 °F during the day and 62 °F night except from August to Mid-September when day temperatures ranged from 75 to 90 °F. Plants were topped when they were 6" over the top wire starting on 10/5.

Fruit harvesting and grading started on 10/5 and continued every week for 11 weeks. Fruit was graded into 5 classes (No. 1 large, over 255g (9 oz), No. 1 medium, from 255g to 99g (3.5 oz), No. 1 small, under 99g, No. 2, and cull) and according to 8 fruit disorder categories (Puff, Cracks, Off Shape, Rough, Off Color, Blossom End Rot, Zippered, and Mixed). No. 1 fruits consisted of well formed smooth tomatoes free from defects. No. 2 fruits were reasonably well formed tomatoes which were free from damage caused by physiological disorders, disease, insects, or other means. Fruits were placed in the mixed category if more than one disorder occurred.

Results

The cultivars 'Caruso', 'Jumbo', and 'Ohio CR-6' had the best combination of early yield (1229 g/plt., 922 g/plt., and 1018 g/plt.,

respectively), fruit size (138g, 163g, and 144g, respectively), and % marketable fruit (79.3%, 72.9%, and 66.8%) (Table 3). 'Dombito' had a comparable early yield (1266 g/plt.) and % marketable fruit (79.9%) to 'Caruso' but had smaller fruit (113g). 'Laura' had good fruit size (168g) and % marketable fruit (68.0%) but a lower early yield (875 g/plt.). Some of the entries that produced a large percentage of marketable fruit had small fruit (less than 110 grams). Ohio 1499 had the largest fruit (134g) of the new pink-fruited experimental lines and had a higher percentage of No. 1 fruit than 'Caruso', 'Jumbo', or 'Ohio CR-6'. However, early fruit yield was low for Ohio 1499 (641 g/plt.). The % No. 1 fruit category was so low because fruit had to be perfectly smooth to be classed as No. 1 fruit. During the early harvests no No. 1 large fruit was produced and 2173/84 produced the most No. 1 medium fruit (1.2).

For the first 5 weeks, the main causes of fruit rejection for all cultivars were roughness, cracking, and off color (Table 4). Some entries produced more off shape or puffy fruit than cracked or off colored fruit. The percentage of cracked fruit was usually higher than the percentage of off color fruit. About 60% of the fruit classed as rough was still marketable as No. 2 fruit, consequently the %rough fruit score was always higher than %cracks or %off color. 'Caruso', 'Jumbo', 'Ohio CR-6', 'Dombito', and Ohio 1499 all had a low disorders/fruit ratio. 'Dombito' was the most crack resistant (3.1%). 2029/83 had the lowest disorders/fruit ratio (0.6) and it had the smoothest fruit (49.5%). The fruit of 2029/83 was also perfectly shaped and free from blossom end rot and zippering.

Table 3. Comparison of greenhouse tomato cultivars for graded fruit classes, yield, fruit size, and percent No. 1 and No. 2 fruit for the first 5 weeks of the trial.²

| Entry/ Seed Source | # of No. 1 Lg/Plt | # of No. 1 Md/Plt | # of No. 1 Sm/Plt | # of No. 2 /Plt | # of Culls /Plt | Fruit Wt/Plt (g) | Fruit Size (g) | % No. 1 Fruit | % No. 1 & 2 Fruit |
|-----------------------|-------------------------|-------------------------|-------------------------|-----------------------|-----------------------|------------------------|----------------------|------------------|-------------------------|
| Ohio Cr-6/OH | | .2 | .2 | 4.2 | 2.6 | 1018 | 144 | 4.1 | 66.8 |
| Ohio 1403/OH | | .3 | .2 | 2.3 | 2.5 | 674 | 126 | 7.3 | 52.9 |
| Ohio 1412/OH | | .4 | .3 | 1.9 | 2.7 | 657 | 126 | 13.5 | 45.5 |
| Ohio 1413/OH | | .3 | .2 | 2.6 | 3.0 | 778 | 125 | 9.0 | 48.7 |
| Ohio 1497/OH | | .6 | .05 | 2.2 | 1.7 | 593 | 126 | 14.8 | 60.3 |
| Ohio 1498/OH | | .5 | .1 | 2.2 | 2.9 | 661 | 117 | 11.3 | 45.8 |
| Ohio 1499/OH | | .6 | .05 | 2.0 | 2.1 | 641 | 134 | 13.7 | 55.3 |
| Caruso/DR | | | .7 | 6.4 | 1.9 | 1229 | 138 | 7.2 | 79.3 |
| Laura/DR | | .3 | .05 | 3.0 | 1.7 | 875 | 168 | 8.5 | 68.0 |
| Perfecto/DR | | .2 | .3 | 4.5 | 3.3 | 1045 | 125 | 6.1 | 62.8 |
| KR-2/DR | | .2 | .4 | 3.2 | 5.0 | 823 | 94 | 6.7 | 43.2 |
| B82-864/DR | | .2 | | 1.9 | 2.9 | 787 | 157 | 3.8 | 42.3 |
| KR-12/DR | | .8 | .5 | 4.5 | 4.0 | 960 | 98 | 12.8 | 59.7 |
| No. 29FT-R/SK | | .3 | .3 | 1.9 | 3.3 | 736 | 126 | 10.2 | 43.3 |
| Pink No. 12/SK | | .2 | .05 | 1.9 | 5.0 | 841 | 117 | 3.8 | 31.3 |
| Fireglow/SK | | .3 | .1 | 1.7 | 5.3 | 963 | 131 | 6.5 | 28.1 |
| Firedance/SK | | .3 | .2 | 1.5 | 5.0 | 900 | 125 | 6.9 | 30.7 |
| Dombello/BR | | .3 | .05 | 3.4 | 4.9 | 1207 | 140 | 4.6 | 43.8 |
| 2029/83/BR | | | 7.5 | 3.8 | 3.9 | 791 | 52 | 48.6 | 74.0 |
| 994/85/BR | | .05 | | .9 | 3.2 | 767 | 182 | 1.4 | 23.3 |
| Dombito/BR | | | 1.2 | 7.7 | 2.2 | 1266 | 113 | 10.9 | 79.9 |
| Dukado/BR | | | | 2.0 | 3.7 | 974 | 171 | | 35.1 |
| 2084/81/BR | | .1 | | 2.8 | 4.4 | 954 | 128 | 1.3 | 38.9 |
| 617/83/BR | | .2 | | 3.4 | 2.6 | 888 | 142 | 2.8 | 57.3 |
| 2173/84/BR | | 1.2 | .5 | 4.4 | 3.3 | 962 | 103 | 17.7 | 65.3 |
| Jumbo/BR | | .5 | | 3.7 | 1.5 | 922 | 163 | 8.7 | 72.9 |
| 986/84/BR | | .3 | .2 | 2.0 | 3.8 | 764 | 119 | 13.3 | 44.1 |
| Bonset/RS | | | 2.1 | 5.2 | 6.8 | 892 | 63 | 15.7 | 51.5 |
| Proset/RS | | .05 | 6.1 | 6.8 | 5.3 | 1102 | 60 | 33.6 | 71.2 |
| Zircon/RS | | .5 | 2.0 | 4.0 | 5.9 | 1210 | 97 | 20.0 | 52.6 |
| Tropic/ST | | | | 1.5 | 1.4 | 579 | 197 | | 54.5 |
| Ont. Pink/ST | | .3 | .05 | 2.3 | 5.4 | 816 | 101 | 4.5 | 33.0 |
| LSD | | .4 | .9 | 1.5 | 1.8 | 282 | 19 | 9.8 | 16.2 |

² No. 1 fruit consists of well formed smooth tomatoes free from defects ("Large" over 255g (9 oz.); "Medium" from 255g to 99g (3.5 oz.); "Small" under 99g). No. 2 fruit consists of reasonably well formed tomatoes which are free from damage caused by physiological disorders, disease, insects, or other means.

Table 4. Comparison of greenhouse tomato cultivars for physiological fruit disorders for the first 5 weeks of the trial.

| Entry/ Seed Source | Disorders /Fruit | % Puff | % Cracks | % Off Shape | % Rough | % Off Color | % Blossom End Rot | % Zippered | % Mixed |
|-----------------------|---------------------|-----------|-------------|----------------|------------|----------------|----------------------|---------------|------------|
| Ohio CR-6/OH | 1.2 | 3.4 | 7.0 | 9.3 | 85.6 | 2.4 | 7.1 | 7.3 | 26.8 |
| Ohio 1403/OH | 1.5 | 1.1 | 33.1 | 2.0 | 92.6 | 8.0 | | 10.6 | 48.2 |
| Ohio 1412/OH | 1.5 | 3.2 | 22.9 | 3.7 | 86.5 | 11.2 | | 21.0 | 46.7 |
| Ohio 1413/OH | 1.5 | | 27.4 | 8.9 | 87.0 | 1.7 | 2.0 | 23.3 | 45.4 |
| Ohio 1497/OH | 1.4 | 3.1 | 29.6 | 6.0 | 82.7 | 2.6 | 1.7 | 17.4 | 40.2 |
| Ohio 1498/OH | 1.4 | 2.0 | 22.4 | 3.9 | 82.2 | 10.4 | 3.8 | 15.5 | 41.7 |
| Ohio 1499/OH | 1.3 | 1.0 | 27.5 | 1.3 | 83.8 | 8.0 | | 11.9 | 42.7 |
| Caruso/DR | 1.1 | 4.5 | 11.8 | 3.8 | 82.1 | 2.1 | | 10.2 | 18.7 |
| Laura/DR | 1.3 | 2.6 | 17.4 | 6.1 | 91.5 | 5.3 | | 8.6 | 32.1 |
| Perfecto/DR | 1.3 | 4.7 | 21.2 | 5.2 | 91.7 | 6.7 | | 2.1 | 29.6 |
| KR-2/DR | 1.5 | .5 | 16.5 | 3.7 | 92.7 | 14.4 | 11.1 | 11.9 | 50.1 |
| B82-864/DR | 1.6 | 3.5 | 21.8 | 3.9 | 96.2 | 31.1 | | 8.0 | 55.0 |
| KR-12/DR | 1.2 | | 15.1 | 1.2 | 85.4 | 9.8 | 3.8 | 6.8 | 32.0 |
| No.29FT-R/SK | 1.5 | 1.0 | 28.0 | 8.7 | 90.5 | 17.9 | | 9.3 | 56.2 |
| Pink No.12/SK | 1.8 | 1.3 | 48.4 | 7.9 | 96.1 | 8.3 | 17.0 | 5.2 | 69.3 |
| Fireglow/SK | 1.7 | 1.3 | 49.3 | 9.2 | 89.2 | 4.3 | 1.7 | 15.8 | 65.8 |
| Firedance/SK | 1.8 | .6 | 44.1 | 8.4 | 91.9 | 11.0 | | 22.8 | 66.6 |
| Dombello/BR | 1.5 | .5 | 32.0 | 10.3 | 94.5 | 14.4 | | 4.1 | 53.6 |
| 2029/83/BR | .6 | .4 | 5.0 | | 49.5 | 6.3 | | | 9.0 |
| 994/85/BR | 1.9 | 4.8 | 58.1 | | 94.2 | 21.6 | | 8.1 | 68.1 |
| Dombito/BR | 1.1 | 9.8 | 3.1 | 8.3 | 86.0 | 3.2 | 3.6 | 1.5 | 20.1 |
| Dukado/BR | 1.8 | 11.3 | 17.5 | 2.4 | 100.0 | 39.8 | | 6.8 | 63.7 |
| 2084/81/BR | 1.7 | 2.4 | 40.8 | 6.8 | 95.6 | 19.8 | | 4.3 | 55.0 |
| 617/83/BR | 1.5 | 3.1 | 24.2 | 5.0 | 98.5 | 13.2 | | 3.2 | 38.0 |
| 2173/84/BR | 1.1 | 2.7 | 16.3 | 3.5 | 80.1 | 2.8 | | 2.8 | 21.4 |
| Jumbo/BR | 1.2 | .9 | 11.1 | 3.0 | 91.3 | 3.8 | | 5.9 | 20.6 |
| 986/84/BR | 1.4 | 4.4 | 27.4 | 2.9 | 85.9 | 14.1 | 3.3 | 5.0 | 47.1 |
| Bonset/RS | 1.3 | 1.9 | 7.6 | 2.3 | 82.7 | 14.0 | 17.7 | 1.3 | 40.8 |
| Proset/RS | .8 | | 10.4 | | 63.5 | 7.0 | | .9 | 15.2 |
| Zircon/RS | 1.1 | | 17.8 | 7.6 | 80.4 | 7.7 | | 1.8 | 30.9 |
| Tropic/ST | 1.5 | 2.6 | 24.6 | 4.9 | 98.1 | 16.7 | | 7.4 | 42.1 |
| Ont. Pink/ST | 1.7 | | 45.9 | 9.4 | 95.5 | 12.4 | | 10.6 | 67.7 |
| LSD | .3 | 4.8 | 16.5 | 5.6 | 11.6 | 10.0 | 7.0 | 7.9 | 17.1 |

During the last 4 weeks of the study, 'Caruso' and 'Jumbo' still had the best combination of yield (1317 g/plt. and 1601 g/plt., respectively), fruit size (144g and 174g, respectively) and % marketable fruit (54.9% and 54.5%, respectively) (Table 5). 'Tropic', Ohio 1499, and 986/84 were the other entries that had a good combination of yield (2004 g/plt., 1633 g/plt., and 1432 g/plt., respectively), fruit size (190g, 132g, and 131g, respectively) and % marketable fruit (47.7%, 46.9%, and 46.6%, respectively) during the end of the trial. 'Caruso' and 994/85 produced a couple of No. 1 large fruit in the last 4 weeks of the trial.

The main defects at the end of the trial were roughness, cracking, and off color (Table 6) with a few entries producing more off shape or puffy fruit than cracked or off colored. Unlike the early harvest, the percentage of off color fruit was usually higher than the percentage of cracked fruit. Overall, the entries in the trial had more disorders/fruit at the end of the study. 'Caruso', 'Jumbo', 'Tropic', Ohio 1499, and 986/84 had similar disorders/fruit ratio's. 2029/83 continued to have the lowest disorders/fruit ratio and had the smoothest and most crack resistant fruit.

Over the entire 11 weeks, 'Caruso', 'Jumbo', and 'Tropic' were the best cultivars in combination of important characteristics (total yield - 3259 g/plt., 3264 g/plt., and 3181 g/plt., respectively; fruit size - 147g, 167g, and 187g, respectively; % marketable fruit - 66.9%, 58.7%, and 47.9%, respectively) (Table 7). 'Caruso' also produced the most No. 1 large fruits (0.11). 'Dombito', 'Ohio CR-6', and Ohio 1499 also produced a good total yield (2904 g/plt., 2685 g/plt., and 3187 g/plt., respectively) and had a high percentage of marketable fruit (61.1%,

Table 5. Comparison of greenhouse tomato cultivars for graded fruit classes, yield, fruit size, and percent No. 1 and No. 2 fruit for the last 4 weeks of the trial.²

| Entry/ Seed Source | # of No. 1 Lg/Plt | # of No. 1 Md/Plt | # of No. 1 Sm/Plt | # of No. 2 /Plt | # of Culls /Plt | Fruit Wt/Plt (g) | Fruit Size (g) | % No. 1 Fruit | % No. 1 & No. 2 Fruit |
|--------------------------|-------------------------|-------------------------|-------------------------|-----------------------|-----------------------|------------------------|----------------------|---------------------|-----------------------------|
| Ohio Cr-6/OH | | .2 | .05 | 3.7 | 3.3 | 876 | 123 | 2.3 | 47.3 |
| Ohio 1403/OH | | .7 | | 5.3 | 7.5 | 1652 | 122 | 4.7 | 43.3 |
| Ohio 1412/OH | | .9 | .2 | 3.8 | 6.2 | 1430 | 129 | 9.5 | 43.6 |
| Ohio 1413/OH | | .7 | .7 | 5.4 | 6.2 | 1599 | 124 | 10.3 | 52.5 |
| Ohio 1497/OH | | .6 | .05 | 6.1 | 7.7 | 1737 | 119 | 5.3 | 49.1 |
| Ohio 1498/OH | | .3 | .2 | 4.3 | 7.0 | 1430 | 122 | 4.1 | 40.5 |
| Ohio 1499/OH | | .6 | .2 | 5.0 | 6.5 | 1633 | 132 | 6.7 | 46.9 |
| Caruso/DR | .05 | .2 | | 4.9 | 4.0 | 1317 | 144 | 2.5 | 54.9 |
| Laura/DR | | | | 4.4 | 5.2 | 1435 | 151 | | 45.8 |
| Perfecto/Dr | | .3 | | 4.9 | 6.1 | 1361 | 120 | 2.1 | 44.9 |
| KR-2/DR | | | .05 | 3.3 | 4.7 | 998 | 122 | .9 | 42.3 |
| B82-864/Dr | | .05 | | 4.2 | 7.8 | 1675 | 139 | .5 | 35.0 |
| KR-12/DR | | .1 | .05 | 5.2 | 4.8 | 1271 | 127 | 1.7 | 54.3 |
| No.29FT-R/SK | | .3 | .1 | 3.0 | 7.8 | 1279 | 115 | 2.7 | 27.8 |
| Pink No.12/SK | | .4 | .1 | 2.7 | 11.1 | 1467 | 101 | 3.7 | 22.6 |
| Fireglow/SK | | .1 | .2 | 3.3 | 8.6 | 1488 | 123 | 2.0 | 29.8 |
| Firedance/SK | | .3 | .05 | 3.9 | 7.2 | 1486 | 127 | 3.1 | 38.6 |
| Dombello/BR | | | | 2.9 | 5.7 | 1310 | 152 | | 33.6 |
| 2029/83/BR | | .2 | 2.7 | 7.9 | 8.5 | 969 | 50 | 14.7 | 56.2 |
| 994/85/BR | .05 | .2 | .05 | 3.4 | 5.0 | 1444 | 164 | 3.1 | 42.4 |
| Dombito/BR | | | | 3.2 | 4.5 | 1173 | 149 | | 41.8 |
| Dukado/BR | | | | 1.3 | 4.9 | 731 | 119 | | 20.0 |
| 2084/81/BR | | .2 | | 4.3 | 9.2 | 1817 | 133 | 1.6 | 33.0 |
| 617/83/BR | | | | 3.9 | 6.1 | 1498 | 142 | | 36.2 |
| 2173/84/BR | | .2 | .2 | 3.5 | 6.9 | 1273 | 117 | 2.9 | 35.8 |
| Jumbo/BR | | .3 | | 4.5 | 4.2 | 1601 | 174 | 3.5 | 54.5 |
| 986/84/BR | | .2 | .1 | 4.6 | 5.8 | 1432 | 131 | 3.0 | 46.6 |
| Bonset/RS | | | .2 | 3.8 | 11.4 | 953 | 62 | 1.1 | 26.6 |
| Proset/RS | | | 1.3 | 10.0 | 10.1 | 1193 | 56 | 5.5 | 52.0 |
| Zircon/RS | | .5 | .9 | 5.9 | 7.4 | 1188 | 81 | 9.5 | 48.4 |
| Tropic/ST | | .2 | | 5.1 | 5.5 | 2004 | 190 | 1.2 | 47.7 |
| Ont. Pink/ST | | | .05 | 2.6 | 8.9 | 1172 | 101 | .4 | 22.0 |
| LSD | .02 | .5 | .6 | 2.3 | 2.4 | 404 | 19 | 5.4 | 18.4 |

² No. 1 fruit consists of well formed smooth tomatoes free from defects "Large" over 255g (9 oz.); "Medium" from 255g to 99g (3.5 oz.); "Small" under 99g). No. 2 fruit consists of reasonably well formed tomatoes which are free from damage caused by physiological disorders, disease, insects, or other means.

Table 6. Comparison of greenhouse tomato cultivars for physiological fruit disorders for the last 4 weeks of the trial.

| Entry/Seed Source | Disorders /Fruit | % Puff | % Cracks | % Off Shape | % Rough | % Off Color | % Blossom End Rot | % Zippered | % Mixed |
|-------------------|------------------|--------|----------|-------------|---------|-------------|-------------------|------------|---------|
| Ohio CR-6/OH | 1.4 | 8.9 | 17.3 | 8.4 | 94.0 | 9.7 | 2.4 | 1.8 | 30.8 |
| Ohio 1403/OH | 1.4 | 7.9 | 14.9 | 5.1 | 92.6 | 15.0 | .5 | .6 | 36.5 |
| Ohio 1412/OH | 1.3 | 8.6 | 19.1 | 6.5 | 89.0 | 8.5 | | 4.0 | 38.8 |
| Ohio 1413/OH | 1.2 | 4.7 | 10.9 | 8.3 | 87.6 | 11.9 | .4 | 1.8 | 32.1 |
| Ohio 1497/OH | 1.4 | 8.8 | 12.2 | 6.6 | 91.9 | 18.1 | | .7 | 36.3 |
| Ohio 1498/OH | 1.5 | 10.9 | 12.7 | 7.0 | 93.8 | 19.7 | .8 | 1.9 | 43.6 |
| Ohio 1499/OH | 1.4 | 6.8 | 18.1 | 5.9 | 92.1 | 17.3 | .9 | 1.3 | 41.5 |
| Caruso/DR | 1.4 | 6.8 | 3.8 | 17.0 | 98.8 | 8.9 | | 1.6 | 30.7 |
| Laura/DR | 1.5 | 13.6 | 8.9 | 12.6 | 100.0 | 13.5 | .6 | 1.0 | 34.0 |
| Perfecto/DR | 1.4 | 16.9 | 2.8 | 6.9 | 96.9 | 12.8 | | 1.0 | 33.5 |
| KR-2/DR | 1.5 | 13.9 | 16.2 | 4.2 | 99.1 | 18.2 | | .9 | 48.8 |
| B82-864/DR | 1.7 | 9.5 | 22.3 | 2.9 | 99.0 | 35.6 | .5 | | 56.6 |
| KR-12/DR | 1.4 | 10.6 | 5.7 | 6.4 | 97.8 | 15.2 | .9 | | 30.1 |
| No.29FT-R/SK | 1.7 | 12.2 | 19.8 | 11.1 | 96.4 | 30.7 | | | 58.3 |
| Pink No.12/SK | 1.7 | 6.0 | 31.0 | 17.1 | 95.9 | 18.2 | 1.9 | .7 | 58.2 |
| Fireglow/SK | 1.6 | 8.5 | 21.7 | 18.8 | 96.2 | 18.7 | | 1.4 | 51.2 |
| Firedance/SK | 1.6 | 7.0 | 26.7 | 12.7 | 97.2 | 17.8 | .6 | 2.4 | 51.2 |
| Dombello/BR | 1.6 | 16.6 | 9.2 | 15.5 | 100.0 | 21.2 | .5 | .7 | 50.8 |
| 2029/83/BR | 1.0 | 1.3 | 1.1 | | 84.5 | 8.8 | .3 | .3 | 10.0 |
| 994/85/BR | 1.5 | 7.7 | 30.0 | 1.9 | 94.4 | 18.5 | | .6 | 48.7 |
| Dombito/BR | 1.4 | 13.2 | 6.9 | 15.5 | 100.3 | 5.4 | | 1.9 | 38.5 |
| Dukado/BR | 1.6 | 22.4 | 1.9 | 7.2 | 100.0 | 30.9 | 1.2 | 2.0 | 47.1 |
| 2084/81/BR | 1.6 | 11.9 | 19.1 | 10.6 | 98.3 | 22.8 | | 1.6 | 49.2 |
| 617/83/BR | 1.5 | 13.5 | 10.1 | 19.8 | 99.4 | 11.9 | | | 44.9 |
| 2173/84/BR | 1.4 | 13.4 | 6.1 | 8.4 | 94.8 | 21.5 | | 1.3 | 39.1 |
| Jumbo/BR | 1.3 | 7.3 | 6.9 | 10.4 | 97.1 | 13.6 | | .5 | 33.4 |
| 986/84/BR | 1.5 | 12.6 | 15.3 | 3.0 | 98.2 | 26.1 | | .6 | 41.6 |
| Bonset/RS | 1.4 | 8.3 | 4.9 | 3.2 | 96.9 | 20.2 | 2.6 | | 34.0 |
| Proset/RS | 1.1 | 1.4 | 3.6 | | 94.0 | 12.7 | | .5 | 18.3 |
| Zircon/RS | 1.2 | 8.6 | 5.2 | 7.5 | 89.7 | 8.3 | | 1.2 | 25.4 |
| Tropic/ST | 1.5 | 10.2 | 8.6 | 17.0 | 98.4 | 16.8 | | .4 | 44.7 |
| Ont. Pink/ST | 1.7 | 23.4 | 17.5 | 16.8 | 99.1 | 18.5 | | .4 | 60.7 |
| LSD | .3 | 9.8 | 13.0 | 7.1 | 7.0 | 12.1 | 1.5 | | 17.8 |

Table 7. Comparison of greenhouse tomato cultivars for graded fruit classes, yield, fruit size, and percent No. 1 and No. 2 fruit for the entire 11 weeks of the trial.²

| Entry/Seed Source | # of No. 1 Lg/Plt | # of No. 1 Md/Plt | # of No. 1 Sm/Plt | # of No. 2 /Plt | # of Culls /Plt | Fruit Wt/Plt (g) | Fruit Size (g) | % No. 1 Fruit | % No. 1 & No. 2 Fruit |
|-------------------|-------------------|-------------------|-------------------|-----------------|-----------------|------------------|----------------|---------------|-----------------------|
| Ohio CR-6/OH | | .4 | .2 | 11.7 | 8.3 | 2685 | 130 | 3.1 | 59.7 |
| Ohio 1403/OH | | 1.3 | .2 | 10.2 | 13.6 | 3127 | 123 | 5.7 | 45.7 |
| Ohio 1412/OH | .05 | 1.6 | .6 | 7.8 | 12.7 | 2824 | 124 | 9.6 | 43.4 |
| Ohio 1413/OH | | 1.2 | .8 | 10.4 | 13.4 | 3140 | 122 | 7.7 | 47.9 |
| Ohio 1497/OH | | 1.4 | | 11.5 | 13.7 | 3204 | 118 | 5.9 | 49.5 |
| Ohio 1498/OH | | 1.2 | .3 | 9.0 | 13.0 | 2701 | 115 | 6.2 | 44.4 |
| Ohio 1499/OH | | 1.3 | .3 | 9.8 | 12.9 | 3187 | 130 | 6.6 | 46.7 |
| Caruso/DR | .11 | .2 | .7 | 13.9 | 7.3 | 3259 | 147 | 4.7 | 66.9 |
| Laura/DR | | .3 | .05 | 9.0 | 9.3 | 3008 | 160 | 2.0 | 50.7 |
| Perfecto/DR | | .7 | .3 | 11.9 | 11.9 | 3107 | 125 | 4.0 | 52.2 |
| KR-2/DR | | .2 | .5 | 8.7 | 12.0 | 2293 | 107 | 3.1 | 44.1 |
| B82-864/DR | | .2 | | 7.4 | 14.3 | 3163 | 144 | 1.0 | 34.7 |
| KR-12/DR | | .9 | .6 | 11.9 | 11.3 | 2720 | 111 | 5.9 | 54.7 |
| No.29FT-R/SK | | 1.2 | .4 | 6.3 | 15.7 | 2763 | 118 | 6.1 | 32.5 |
| Pink No.12/SK | | .7 | .2 | 6.4 | 21.5 | 3088 | 106 | 3.1 | 25.6 |
| Fireglow/SK | | .5 | .3 | 6.7 | 19.3 | 3251 | 122 | 2.9 | 28.0 |
| Firedance/SK | | .7 | .4 | 7.5 | 16.2 | 3110 | 123 | 4.4 | 35.8 |
| Dombello/BR | | .3 | .05 | 7.0 | 13.6 | 3102 | 147 | 1.9 | 35.6 |
| 2029/83/BR | | .2 | 11.9 | 14.4 | 16.1 | 2134 | 50 | 28.3 | 62.3 |
| 994/85/BR | .05 | .3 | .05 | 5.5 | 10.9 | 2839 | 168 | 2.7 | 35.2 |
| Dombito/BR | | | 1.3 | 12.1 | 8.5 | 2904 | 131 | 5.9 | 61.1 |
| Dukado/BR | | | | 3.7 | 10.3 | 2016 | 146 | | 25.6 |
| 2084/81/BR | | .3 | | 8.6 | 17.3 | 3476 | 132 | 1.3 | 34.1 |
| 617/83/BR | | .2 | | 9.0 | 11.5 | 3061 | 146 | 1.1 | 44.0 |
| 2173/84/BR | | 1.5 | .7 | 9.3 | 11.9 | 2586 | 110 | 9.2 | 49.3 |
| Jumbo/BR | | .9 | | 10.3 | 8.1 | 3264 | 167 | 4.8 | 58.7 |
| 986/84/BR | | .7 | .3 | 8.5 | 13.4 | 3048 | 130 | 5.7 | 43.4 |
| Bonset/RS | | | 2.8 | 11.5 | 22.5 | 2336 | 63 | 7.4 | 38.1 |
| Proset/RS | | .1 | 8.0 | 20.7 | 20.0 | 2857 | 58 | 16.3 | 58.4 |
| Zircon/RS | | 1.3 | 4.1 | 12.8 | 17.0 | 3079 | 87 | 15.2 | 51.3 |
| Tropic/ST | | 1.3 | .1 | 7.8 | 8.8 | 3181 | 187 | 1.4 | 47.9 |
| Ont. Pink/ST | | .3 | .2 | 5.9 | 17.9 | 2493 | 101 | 1.6 | 26.2 |
| LSD | .20 | 5.1 | 6.4 | 19.8 | 20.9 | 599 | 14 | 4.7 | 11.5 |

² No. 1 fruit consists of well formed smooth tomatoes free from defects ("Large" over 255g (9 oz.); "Medium" from 255g to 99g (3.5 oz.); "Small" under 99g). No. 2 fruit consists of reasonably well formed tomatoes which are free from damage caused by physiological disorders, disease, insects, or other means.

59.7%, and 46.7%, respectively) but had smaller fruit than 'Caruso' (131g, 130g, and 130g, respectively).

The main causes for fruit rejection over the entire 11 weeks for almost all the entries was for roughness, cracking, and off color (Table 8). Some entries produced more off shape or puffy fruit than cracked or off colored fruit. 'Tropic' had the highest disorders/fruit ratio of the top 6 cultivars. 2029/84 had the lowest amount of disorders/fruit. The fruit of 2029/84 was crack resistant (3.0%), smooth (70.5%), well shaped (0.0%) and almost completely free from zippers (0.1%).

Discussion

Based on the results of this trial, the best red-fruited cultivars for a fall crop were 'Caruso' and 'Jumbo'. 'Caruso' is the best choice because it has TMV resistance. However, it should be noted that both 'Caruso' and 'Jumbo' are susceptible to Fusarium Crown and Root Rot. The best pink-fruited entries were 'Ohio CR-6' and a promising new experimental hybrid (Ohio 1499). Ohio 1499 is resistant to the same diseases as 'Ohio CR-6' (TMV, Fusarium Crown and Root Rot, Fusarium Wilt Race 1 and Verticillium Wilt Race 1) and in addition it has resistance to Fusarium Wilt Race 2 and Root Knot Nematode.

Table 8. Comparison of greenhouse tomato cultivars for physiological fruit disorders for the entire 11 weeks of the trial.

| Entry/Seed Source | Disorders /Fruit | % Puff | % Cracks | % Off Shape | % Rough | % Off Color | % Blossom End Rot | % Zippered | % Mized |
|-------------------|------------------|--------|----------|-------------|---------|-------------|-------------------|------------|---------|
| Ohio CR-6/OH | 1.3 | 8.8 | 8.8 | 10.9 | 92.0 | 4.9 | 4.3 | 2.9 | 31.4 |
| Ohio 1403/OH | 1.4 | 7.8 | 20.5 | 4.9 | 92.8 | 14.7 | .3 | 3.0 | 40.2 |
| Ohio 1412/OH | 1.4 | 6.0 | 21.6 | 6.0 | 89.5 | 11.6 | | 7.1 | 42.5 |
| Ohio 1413/OH | 1.4 | 3.4 | 19.6 | 7.7 | 89.8 | 10.2 | .8 | 6.9 | 37.1 |
| Ohio 1497/OH | 1.4 | 6.5 | 17.5 | 7.5 | 92.0 | 13.8 | .3 | 4.7 | 37.5 |
| Ohio 1498/OH | 1.4 | 6.8 | 13.8 | 6.7 | 90.6 | 16.8 | 1.2 | 5.1 | 40.4 |
| Ohio 1499/OH | 1.4 | 4.3 | 22.9 | 5.3 | 92.5 | 15.1 | .5 | 3.9 | 43.8 |
| Caruso/DR | 1.3 | 6.9 | 8.5 | 10.8 | 89.8 | 6.7 | | 4.7 | 27.9 |
| Laura/DR | 1.5 | 11.4 | 14.5 | 12.0 | 97.6 | 12.4 | .3 | 3.3 | 40.0 |
| Perfecto/DR | 1.4 | 12.6 | 10.2 | 7.1 | 94.2 | 12.2 | | 1.2 | 33.6 |
| KR-2/DR | 1.5 | 6.4 | 16.2 | 4.4 | 96.9 | 16.9 | 5.0 | 5.6 | 47.9 |
| B82-864/DR | 1.8 | 9.6 | 23.2 | 4.7 | 98.7 | 40.3 | .2 | 2.1 | 59.1 |
| KR-12/DR | 1.3 | 4.7 | 9.9 | 3.9 | 93.1 | 16.0 | 1.8 | 2.6 | 32.8 |
| No.29FT-R/SK | 1.6 | 8.0 | 25.3 | 10.7 | 92.7 | 24.7 | | 3.0 | 56.7 |
| Pink No.12/SK | 1.7 | 4.0 | 35.3 | 14.5 | 96.3 | 15.9 | 5.5 | 1.6 | 61.7 |
| Fireglow/SK | 1.7 | 5.8 | 32.9 | 14.4 | 94.6 | 14.3 | .7 | 5.9 | 57.7 |
| Firedance/SK | 1.7 | 4.8 | 34.3 | 9.9 | 94.7 | 14.9 | .3 | 8.0 | 55.4 |
| Dombello/BR | 1.7 | 11.7 | 22.1 | 12.0 | 97.7 | 21.2 | .2 | 1.9 | 55.9 |
| 2029/83/BR | .8 | .7 | 3.0 | | 70.5 | 8.4 | .1 | .1 | 10.3 |
| 994/85/BR | 1.7 | 6.5 | 42.2 | 2.0 | 95.0 | 20.7 | | 2.4 | 57.2 |
| Dombito/BR | 1.3 | 14.5 | 6.3 | 13.3 | 92.5 | 4.7 | | 1.5 | 35.0 |
| Dukado/BR | 1.8 | 18.6 | 11.5 | 4.8 | 100.0 | 40.1 | 2.0 | 3.8 | 58.0 |
| 2084/81/BR | 1.7 | 9.1 | 27.7 | 10.1 | 97.7 | 23.3 | | 2.0 | 54.5 |
| 617/83/BR | 1.6 | 10.3 | 18.0 | 14.3 | 99.0 | 14.9 | | 1.0 | 45.2 |
| 2173/84/BR | 1.3 | 8.3 | 11.0 | 5.9 | 88.7 | 14.2 | | 2.1 | 32.6 |
| Jumbo/BR | 1.4 | 6.1 | 11.2 | 8.2 | 95.5 | 14.0 | | 2.0 | 32.7 |
| 986/84/BR | 1.5 | 9.0 | 21.7 | 3.2 | 94.2 | 24.5 | .8 | 1.8 | 47.3 |
| Bonset/RS | 1.3 | 8.1 | 5.5 | 3.3 | 90.8 | 16.7 | 9.5 | .5 | 38.1 |
| Proset/RS | 1.0 | .6 | 6.7 | .1 | 82.3 | 11.9 | | .6 | 18.7 |
| Zircon/RS | 1.1 | 3.9 | 10.4 | 7.3 | 83.3 | 8.7 | | 1.2 | 27.1 |
| Tropic/ST | 1.6 | 9.3 | 17.7 | 12.5 | 98.5 | 17.8 | | 2.6 | 47.8 |
| Ont. Pink/ST | 1.8 | 14.2 | 31.1 | 13.1 | 98.2 | 16.2 | | 3.4 | 63.3 |
| LSD | .2 | 6.7 | 10.0 | 4.4 | 5.9 | 7.7 | 3.1 | 2.9 | 12.5 |

This page intentionally blank.

This page intentionally blank.

This page intentionally blank.